

Oklahoma State University Institute of Technology
Face-to-Face Common Syllabus
Spring 2018

ACR 2443 SYSTEM CONTROLS

Topics include the operation, calibration, and servicing of equipment with direct digital control systems. Systems with both dedicated and programmable controls are covered. Special emphasis is placed on checking inputs and outputs to individual control systems.

Course Purpose:

Give learners a foundation in Direct Digital Controls and an introduction to Energy Management Systems.

Type of Course: Theory/Lab

Credit Hours: 3; Total clock hours of theory per semester: 30;

Total clock hours of lab per semester: 45.

Class Length: Full Semester

Class Days and Times: Section 001: TTR 7:30 – 9:55
Section 002: MWF 7:30 – 9:00
Section 003: MWF 9:30 – 11:00
Section 004: MWF 11:30 – 12:55

Prerequisites: ACR 1343

Instructor Name: Chris Lamm

Instructor Phone: (918) 293-5312

Office: Bldg. 315 Room #114B

Instructor Email: chris.lamm@okstate.edu

Contact: My preferred method of contact is e-mail. Please allow 24-48 hours to return your correspondence during the normal work week.

Instructor's Office Hours: MWF 9:30 – 11:30; other times available by appointment.

School Name: Construction Technologies

School Main Phone: 918-293-5304

REQUIRED TEXT, REFERENCES, AND MATERIALS

Texts: N/A

References: Refrigeration and Air Conditioning Technology 8th Edition \$142.80
ISBN# 978-1-305-57829-6 (Same as program text)

Materials: Notebook, lead pencils, colored pencils, calculator, USB data storage device.

Uniform/Tools: Pocket screwdriver plus volt meter (tools used in prerequisites).

Estimated Cost for Materials: \$ 40

Estimated Cost for Uniform/Tools: \$ N/A

Optional Resources: N/A

Upon completion of the course, students should:

Course Objectives	Assessment of Objectives
Select different types of input devices, and use a variety of output devices that are common to direct digital controls.	Unit exams, homework assignments, Lab projects
Should be capable of doing basic troubleshooting on direct digital controls	Unit exams, homework assignments, Lab projects
Set addresses on controls	Unit exams, homework assignments, Lab projects
Build points for input devices.	Unit exams, homework assignments, Lab projects
Wire different types of input devices.	Unit exams, homework assignments, Lab projects
Wire and check out various types of actuators.	Unit exams, homework assignments, Lab projects
Wire up heating and cooling systems.	Unit exams, homework assignments, Lab projects
Use a time scheduling program.	Unit exams, homework assignments, Lab projects
Set up a variable air volume control.	Unit exams, homework assignments, Lab projects
Set up and change variables on a variable frequency drive motor.	Unit exams, homework assignments, Lab projects

Aspects of the course objective assessments may be used in the university's assessment of student learning. If applicable, an asterisk (*) above indicates this assignment is used in the university assessment program.

COURSE ACTIVITIES

In this course students will:

- Participate in class discussions and activities.
- View videos and slide shows that depict the various concepts.
- Utilize open (free) resources on the World-Wide Web.
- Wire high and low voltage controls.
- Apply basic mathematic skills.
- Take examinations.
- Complete reading assignments.
- May be required to do quizzes.

EVALUATION - GRADES WILL BE BASED ON THE QUALITY AND COMPLETION OF THESE TASKS:

Lab: Class Projects/Exams	55%
Theory: Homework/Quizzes/Exams	25%
Participation/Team Assessment	20%
<u>Total</u>	<u>100%</u>

OSUIT Grading Scale
A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% & below

*The student's grade for this assignment will be used in the university's assessment of student learning. A 70% competency or higher receives a Pass rating. This Pass/Fail rating is independent of the student's course grade.

Daily and/or weekly quizzes, small weekly assignments and similar type projects: Normal return time to student by next class meeting or no later than one (1) week.

Extensive assignments, large lab projects, extensive quizzes, exams and similar type projects: Normal return time to students in one (1) to two (2) weeks.

PARTICIPATION- The overall participation grade will account for 20% of the final grade. Participation grades are evaluated based on class participation, lab participation & overall involvement in all class activities. A student must be present and participating in discussions or lab work in order to receive a participation grade. If a student is absent or not participating there will be 6.67 points deducted for each occurrence. This scale is parallel to the university's attendance policy. Each student may have up to six (6) hours of excused absences if prior arrangements are made with the instructor.

RECOMMENDED STUDENT COMPETENCIES/SKILLS

Basic working knowledge of the Windows operating system.

Basic mathematical knowledge (Add, Subtract, Multiply, Divide fractions and whole numbers).

AUTHORIZED TOOLS

Students may use any/all course materials, including books and notes, while participating in Lab projects. All quizzes and written assignments are to be completed independently; no collaboration with classmates is permitted and any instance of such will be considered academic dishonesty.

LATE WORK

A student must be present to receive their assignment, and all assignments are due within the first five (5) minutes of class on the next class day. Homework that is not turned in at the proper time is considered late. Late homework will be accepted but 20% will be taken off your assignment grade for each day it is late up to 5 days.

TESTING

All students should be present on test day. Ten percent will be taken off per day that a person is late for taking a test. Cell phones cannot be used when taking a test. Calculators can be used when taking a test.

OTHER LAB AND CLASSROOM POLICIES

The Systems Controls lab is equipped with sensitive electronic equipment and students should take care when assembling, wiring, or manipulating this equipment for any project. Food item will not be allowed. Sealed (spill-proof cap or lid) drink containers may be allowed.

SYLLABUS ATTACHMENT

View the Syllabus Attachment, which contains other important information, by visiting http://osuit.edu/center/student_syllabus_information

Course Schedule			
Week	Topic	Assignment Description	Assessment
Week 1	Orientation	In-depth look at course syllabus, course requirements, course objectives, and classroom safety.	
Week 2	Introduction to DDC controls	To look at basic automatic controls as it applies to direct digital control systems.	Written Exam
Week 3	System Architecture	To help the student understand a basic LAN and SubLAN system.	Written Exam
Week 4 - 5	System Addresses	To help the student understand how individual points in a system are identified.	Written Exam
Week 6	Setting up the 7716 PCU	To learn to set up control applications, baud rates and addresses on the 7716 PCU.	Written Exam
Week 6 - 7	The universal input circuit	To show the students how different types of inputs can be used with controls, and how to build the input points.	Written Exam
Week 8	Output points	To help the students understand how output points are addressed and the capabilities of these different outputs.	Written Exam
Week 9	Loading Programs	To learn how to load a program into the computer and in the controllers, and use program modules	Written Exam
Week 10	Time Scheduling	To learn to use time scheduling to turn heating and cooling on and off.	Written Exam
Week 11	2-pos module & fan status	To use the 2-position module in our program and to use a fan status control.	Written Exam
Week 13 - 15	PWM, VDC and Milli-amp actuators	To help the student understand what a PWM, VDC, and ma actuator is, and how they are used with a proportional module.	Written Exam
Week 16	Variable Frequency Drive Motors	To wire and program variable frequency drive motors. To look at applications where these motors will be used in our industry.	Written Exam

Schedule is subject to change at instructor discretion.